Osprey, *Pandion haliaetus*

Status: ***State:*** Threatened ***Federal:*** Not listed

Identification

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The osprey is a large raptor with a wingspan of 4.5 ft. to 6 ft. When gliding, the osprey's long, narrow wings are pulled towards the body and its silhouette is analogous to an "M" shape, closely resembling a gull in flight. In a shallow glide or full soar, the wings are bowed downwards. Ospreys fly with stiff and shallow wing beats, pumping the head and body up and down while flapping.

The adult osprey is dark brown above and light below. The underside is white with contrasting dark carpal ("wrist") patches and barred flight feathers. The head is white with a broad, black eye stripe that extends to the back of the neck. The tail and flight feathers are dark brown with faint white bands. Adult females and juveniles of both sexes exhibit a "necklace" of dark feathers contrasting with the white feathers of the upper breast. The intensity of this necklace varies among individuals, with some adult males also displaying this trait. Females are only slightly larger than males and, excluding the necklace, the plumage of both sexes is identical. Juvenile ospreys closely resemble adults. However, juveniles exhibit buffy tips to the upperwing coverts, a more heavily streaked crown, mottled carpal patches, and a tawny wash to the underwing that fades by the following spring.

On all ages, the osprey has a pale blue-gray cere (fleshy area behind the base of the bill) and legs. Their toes are equipped with tiny spines, or spicules, that enable them to grasp slippery fish. The bill is black and strongly hooked with a sharp tip for piercing the skin of fish. The osprey's eye color changes from blood red in nestlings to orange-yellow in juveniles to yellow in adults. The osprey's call is a high-pitched, down-slurred whistle that is often repeated in a short series.

Habitat

As a piscivorous species, the osprey is strictly associated with bodies of water that support adequate fish populations. Consequently, ospreys inhabit coastal rivers, marshes, bays, and inlets as well as inland rivers, lakes, and reservoirs. Ospreys nest on live or dead trees, man-made nesting platforms, light poles, channel markers, abandoned duck blinds, or other artificial structures that are in close proximity to fishing areas and offer an unobstructed view of the surrounding landscape. Infrequently, ospreys nest on the ground within coastal marshes. Territories typically contain poles, snags, or structures near the nest on which the ospreys perch.

Status and Conservation

In the 1800s, the osprey was an abundant breeding species along the New Jersey coast. In 1884, there were 100 nests at Seven Mile Beach, currently Avalon/Stone Harbor, alone. However, by 1890, the number of ospreys nesting at Seven Mile Beach shrank to only 25 pairs, and similar declines were evident throughout the state. These early population declines are attributed to habitat loss, eradication of nest trees, egg collecting, and shooting. Further declines in the osprey population continued through the turn of the century and into the 1930s and 1940s. As human settlement along the coast increased during this time, trees that were used by ospreys as nesting sites were destroyed.

The pesticide DDT was first used to control mosquitoes in Cape May County marshes in 1946 and was applied at increasing rates until 1964. When introduced into the environment, DDT enters the food chain and bioaccumulates at each trophic level, contaminating top level predators such as the osprey with high doses of this biologically harmful pesticide. DDT contamination inhibits calcium metabolism in birds, reducing the thickness of the eggshell. When an adult bird attempts to incubate an egg with a thinned shell, the egg will break under the weight of the bird. Because DDT contamination may remain within an adult osprey's body for years, pairs can continue to experience reproductive failure over a long period of time.

Following the use of DDT, osprey populations in New Jersey plummeted due to several decades of poor productivity. Prior to the 1950s, the osprey population in New Jersey was estimated at 500 pairs (Leck 1984). In 1950, there were 253 nesting pairs along the Atlantic Coast of New Jersey south of Barnegat Light. By 1975, only 53 pairs remained in this area and a total of only 68 pairs remained statewide.

Due to its disastrous environmental impacts, the use of DDT was banned in New Jersey in 1968 and in the United States in 1972. However, because of its persistence in biological systems, contamination from DDT and its metabolite, DDE, continued to impair osprey productivity. Ospreys in areas that experienced the most severe population declines and the lowest productivity in the state were also found to contain the highest DDT levels in their eggs. Osprey eggs collected in New Jersey during the early 1970s yielded much higher DDT and DDE concentrations than those from other states. In addition, analysis of eggs from New Jersey ospreys also revealed contamination from PCBs.

Pesticide contamination and habitat loss had reduced New Jersey's osprey population to a tiny fraction of its former level. Consequently, the osprey was one of the first species to be included on the New Jersey Endangered Species List when the New Jersey Endangered Species Conservation Act passed in 1974. With this legislation came the establishment of the New Jersey Endangered and Nongame Species Program (ENSP), a team of biologists dedicated to the conservation of New Jersey's imperiled wildlife. In 1979, the ENSP began an osprey reintroduction program in which biologists transplanted eggs from healthy nests in the Chesapeake Bay area into active, but unsuccessful, New Jersey nests. In addition, biologists erected nesting platforms to support a growing population and began annual surveys to monitor osprey productivity.

Slowly, the osprey population began to recover, as nesting success improved and the number of nesting pairs increased each year. The state population grew from a low of 68 pairs in 1975 to 87 pairs in 1981. Productivity had improved from 0.42 young per active nest in 1968-1972 to 0.97 in 1979 and to 1.18 in 1982-1984. Due to its improved reproductive success, its acceptance of man-made nesting structures, and the decline of persistent pesticides, the status of the osprey was changed from endangered to threatened in New Jersey in 1985. The osprey, brought back from the brink, was the first to be removed from the endangered species list in New Jersey. The New Jersey Natural Heritage Program considers the osprey to be "demonstrably secure globally" yet "rare in New Jersey" (Office of Natural Lands Management 1992).

After 1985, New Jersey's osprey population grew beyond 200 pairs and productivity was stable at around 1.3 to 1.5 young per active nest. The ban of DDT, the reintroduction of healthy eggs, and the ospreys' acceptance of artificial nest sites are largely responsible for this species' recovery.

However, despite increases in productivity along the Atlantic Coast, osprey production along the Delaware Bay Coast, particularly in Salem County, remained low throughout the 1980s. Productivity in Salem County, which averaged 0.63 young per active nest from 1974 to 1984, was well below productivity in other areas of the state, which often exceeded one young per active nest. In addition, the number of active nests in Salem County declined from 1984 to 1987. In 1987, ENSP biologists initiated an investigation into the poor productivity of this population. Contaminant analysis revealed that Delaware Bay ospreys experienced more severe eggshell thinning and higher levels of contaminants such as DDE, DDD, PCBs, and dieldrin heptachlor epoxide than Atlantic Coast ospreys. In addition, fish samples collected from Delaware Bay in 1990 contained higher contaminant levels than those from the Atlantic Coast. Osprey eggs and blood collected from Salem County nests from 1991 to 1994 were compared to samples taken from declining populations around the Great Lakes. The analysis revealed that ospreys nesting along Delaware Bay had higher organochlorine and PCB levels than Great Lakes osprey populations. However, by the late 1990s, organochlorine pesticide levels had declined in osprey eggs and fish collected along the Delaware Bay, allowing for improved nesting productivity in this area. Productivity among Delaware Bay nests averaged a very healthy 1.78 young per nest in 2001.

Ospreys nesting along the Atlantic Coast of New Jersey experienced a dramatic reduction in productivity in 1997 and 1998, possibly due to a scarcity of prey. But productivity, which averaged only 0.6 young per nest along the Atlantic Coast during these years, returned to a normal average of 1.3 young per nest in 1999 and 2000, and increased to nearly 1.6 in 2001. The biennial aerial osprey survey in 2001 tallied 340 pairs in the state, the majority of which were located along the Atlantic Coast.